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Study case: yellow tag vs quality management

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Abstract

5S is a common tool for improving workplace productivity, quality, throughput and safety. Many companies implementing Lean Manufacturing start with a series of 5S events to remove the workplace and improve workflows between processes. Predominantly used in the manufacturing sector, they can now be found deployed in diverse industries such as banking, mining, construction and many other industries. The S pillars are available in order to improve because waste must be made visible. When it is visible, we must learn to see. Part of a Lean Manufacturing organization is to expose waste and then to systematically attack it. 5S is used to manage the work area more effectively and should not be confused with other programs such as TPM (total productive maintenance) that are more machine and equipment focused, even though the concepts are similar.

Keywords: 5S,6S, quality management, lean manufacturing**,** safety, yellow tag, life cycle product

1. Introduction

Environmental wastes can be a symptom of a suboptimal system. 6S can help the organization to reduce waste and improve environmental performance leading to increased system productivity.
Full implementation of 6S requires looking not only at the quantity, usefulness, and frequency with which an item is used in a work area, but it also means paying close attention to what ends up in waste streams and how to manage those wastes [8].
Many 5S programs don't consider environmental and ergonomic analysis which is an integral part of organization management. Massive training is conducted, but the skills not immediately used by everyone, causing waste and low knowledge retention.
As a by-product it improves working conditions by making things cleaner, brighter, and safer. Having said all this, the most effective way to implement 5S for organization money is to implement it as value stream improvements are being made [7].
The primary objective of 5S is to create a clean, orderly environment- an environment where there is a place for everything and everything is in its place. Beyond this, many companies begin their lean transformation with 5S because it exposes some of the most visible examples of waste it also helps establish the framework and discipline required to successfully pursue other continuous improvement initiatives
6S also fosters a culture of continual improvement and employee engagement that is essential for successful implementation of Lean [10].

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6S often makes it easier to implement other lean methods such as cellular manufacturing, one-piece flow, and just-in-time production. 6S is model after the 5S process improvement system designed to reduce waste and optimize productivity in the workplace by:

- creating and maintaining organization and orderliness;
- reducing defects and making accidents less likely;
- almost all accidents are preventable;
- tools, materials, pallets are no longer left in aisles thus creating a much safer work environment.

The organization disturbances influence the future orientation taking in consideration the new trend of green products, this will make a challenge for discovering new solutions and change management for environmental management process.

2. Research method

A yellow-tag strategy is a simple method of identifying environmental wastes and items that may be harmful to human health or the environment in the work area, evaluating the need for these items and potential alternatives, and addressing them appropriately.

The objective of this strategy is to identify environmental wastes in the work area with a yellow tag, evaluate their need and potential alternatives [9].

Identify yellow-tag targets such as hazards and environmental wastes, we have to followed some criteria for evaluating yellow-tagged items such as:

- make and attach yellow tags to identified items and include data to allow for evaluation of performance improvements.
- evaluate and address yellow-tagged items.
- document results.

Yellow tags warning and alert workers about existing or potential hazards in the work area or that identify potential areas to target for improvement in the future especially for environment [11].

Yellow-tagging is a simple strategy used to:

- identify environmental wastes and items that may be harmful to human health or the environment in the work area
- evaluate the need for these items
- evaluate potential alternatives for these items
- address them appropriately

A yellow-tag strategy is designed to supplement strategy or improvement opportunities.

The basic steps in yellow-tagging process can be divided into four steps:

Step1- Identify yellow-tag targets and criteria

- Make and attach yellow tags
- Evaluate and take care of yellow-tagged items
- Document and share the results

Step 2- Make and Attach Yellow Tags

- Can be as simple as yellow sticky notes stating the reason for the yellow tag
- Can contain standard data that your company uses for tracking materials
- Key is to include data that will allow your company to evaluate performance improvements from 6S and support your company's overall materials tracking system

Step3- Evaluate and Address Yellow-Tagged Items

If we find an answer to the "why" five times to identify the root cause then we have to ask "how" to address the root cause

Step 4- Document and Share the Results: document necessary information from the yellow-tagging process in a log book or other system, track the improvements and savings that have resulted from yellow-tagging, share results with others to generate ideas for future improvements.

The 6S pillars work together to increase productivity, reduce defects, save time, and reduce costs. In this way we can describe mainly the content of information concerning the product and the usage of system functionality with regard to each stage of design development.

3. Study case

3.1. A Model Equation of flexibility and knowledge product

Analyzing the work area for additional improvement opportunities and look for ways to reduce sources of waste and error as well as to make the workplace more visually instructive a simple example can show the efficiency of the method. Eliminating Environmental Waste and Risk through 6S inspections help companies to sustain the improvements made during initial 6S events [2], [4].
The article present a model equation for knowledge product, a equation of flexibility and knowledge product which can be written in function of following variables identify for manufacturing industry process:

$$\mathbf{EKP = f(Q_p, Q_a, Q_d, P_q, P_a, P_d, T, M, A)} \quad [1]$$

where Q_p = represent the quality perception, Q_a= quality action and Q_d= quality decision, P_q,-quality perception , P_a,-action perception, P_p- decision perception, T-technology, M-man, manufacture power, A-affectable variable.

3.2. A model for knowledge product process

A model for knowledge product process it is presented in the following scheme which identify the way and the variables observed or affected which disturb the product process [15].
Knowledge it's part of every stage of life cycle product from the design stage, business information, organization work harmonize with the new environmental changes and finished with the new model of knowledge product (Figure 1).

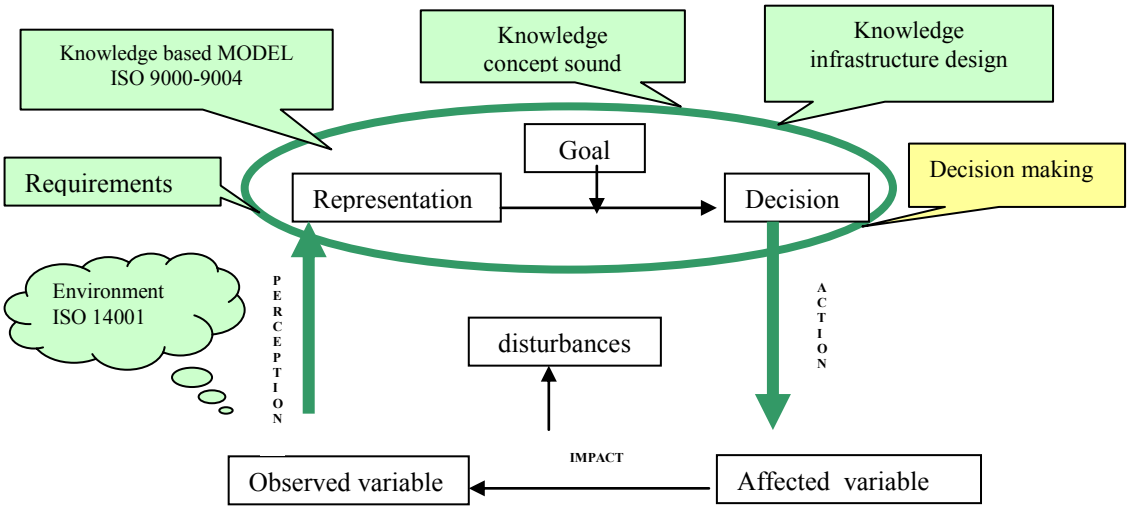

Fig.1. Modelling of Knowledge Product Process

The new trend of friendly product and friendly environment influence the enter activity of knowledge product because of the perception and the action of disturbance variables: noise, vibration, failures, damages, pollution.
The new provocation for designer will be to establish the connection and choose the best solutions and suitable programs for product, taking in consideration the matrix and learn from the each evolution of the cycle design [11].

4. Results

4.1. A model for PLC Life Cycle Product Knowledge

The investigation was realize as a study which can be apply in industrial products which needs quality improvement and maintaining PLC.

Following the road of the model concept for improvement products like in figure 1, I select the DECISION in design knowledge from manufacturing technological process.

The article present a practical study realized in industrial manufacturing process along the PLC of a product. A new solution can be translating PLC knowledge into the improvement product matrix as a solution for the design version in function of the needs and demands of the customers [18], [21].

These model of strategies could include new version, new distribution in short anything that will inject a little life into the cycle, the graphic demonstrate this point of view, the final stage in the life cycle is the decline.

Theoretically the product life-cycle is a smooth and elegant curve; in reality there are constant short-term fluctuations due to external factors.

The first common mistake is to assume that any reduction in sales signals the onset of the decline phase. The area between stages 1 and 2 may at first appear to be decline, but in fact are part of the growth stage. Similarly, the area between points 3 and 4 may at first be read as a new growth phase; in fact it is little more than a temporary increase that has no real significance (Figure 2.).

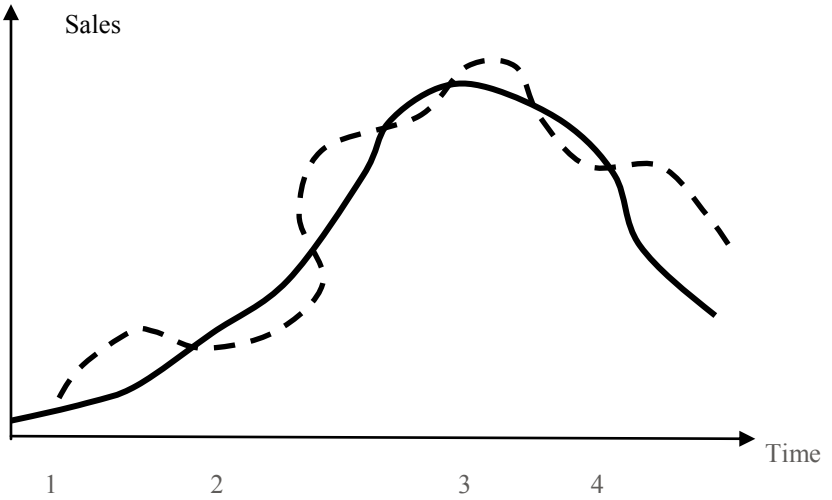

Fig. 2. Life Cycle Product Model theoretical trend - sales –manufacturing process

The final stage in life cycle is the decline that's doesn't mean death of the product or doesn't necessarily mean that's time to abandon the product, but that's mean the introduction of new strategies might be in order.

Moreover, a new design support system shall at least have those capabilities which the previous one had, it should as well of course provide more or better functionality.

This doesn't necessarily mean that it's time to abandon the product, but rather that the introduction of new strategies might be in order. Each of the stages have their own characteristics, and each are open to different strategies being implemented [6], [21].

However, for many this stage will prove to be the critical one; many wait until this period before acting, and it is the only stage where some sort of action is critical.

So yellow tag help the engineering in manufacturing design stage to select from different strategies the best solution for their product from the first stage of the new -low design product [6].

The model can be used in function of the needs and demands of the product and also in different stages of life cycle of the product and to be adapted in function of the environment restrictions [19]. [10], [11].

Not at last the article present the interdependency between the customers intelligence and customer enterprise model using the simulation and virtual environment design for the green products [5].
Company's mission is to provide technical conditions for obtaining total quality through effective exploitation of the means of production (Table 1).

Table 1: Description of engineering knowledge with respect to information content and usage during life cycle

Product Life Cycle Product Property	Product planning	Conceptual design	Final design	Production planning	Production
functions		(2)	(2)		
solution principles	(6)		(1)(3)(6)		
geometry			(1)(3)		
tolerances	(6)		(3)(6)		
materials	(6)		(4)(6)	(4)	(4)
manufacturing methods			(3)		
costs			**(4)**	**(4)**	**(4)**
time	**(2)**	**(2)**	**(2)(3)**	**(2)**	
usage properties			(3)		
environmental properties	**(5)(6)**	**(5)(6)**	**(5)(6)**	**(5)(6)**	

1– PRO-Engineer, (2) – CAD, (3) – ANSYS, (4) - TOSCA, (5) – DEMAND, (6) - PRODUCT DESIGN

5. Conclusion

The pillars work together to increase productivity, reduce defects, make accidents less likely, save time, and reduce costs. They can also help reduce hazards and improve environmental performance.
We have investigated the presence of the factors of TQM, and we identify the following results: management commitment, customers focus, work environment 5S, performance measure, human resources.
Inside the organization, an effective allocation of decision rights controls will bring advantages of Lean Manufacturing:

- **For the individual:** spend less time looking for your documents, reduce the clutter, improved teamwork
- **For the team**: reduce training time for new employees, everybody organized the same way, documents available to everyone who needs them
- **For the organization:** making sure information useable and available, legal and regulatory compliance, protect information from loss or disaster. The six major sources of losses that lead to support the implementation of such a system are: stop-time accidental, time to change, adjustment and adaptation of equipment, micro-machine stops, slow-functioning equipment, defect quality and start-faults.

Another way to improve the organization activity can be resuming to two words:
1) Reduce: non-value adding activity, mistakes from employees, time for employee orientation and training, search supplies stored in inventory, carrying cost, unnecessary human motion and transportation of goods.
2) Improve: space utilization, product quality, extending equipment life and life cycle product all these factors lead, in turn, the success of the company's productive activities.
Having products with a more or less complete product description, the designer is able to extract such interrelationships manually and to use them when he is going to make improvements to his products or to create new products, using the experience and knowledge of already concluded designs.
A model of SWOT Analysis can be easy done for any organization to identify the micro-environment management of organization and define the problems (Tabel 2).

Table 2. SWOT Analysis Model for environmental management of organization

STRENGTHNESS	WEAKNESS
• Help to protect the environment	• People still not used with this idea

• Give a peaceful place to work
• It is a benefit for micro climate work
  • technological process
  • health
  • noise
  • reliability and quality products
	• Need time to be accepted by all
	• Costs
	• Needs and customers demands

OPPORTUNITY	**THREATS**
• Better results in work productivity • Less factors which affected the environment • Increase the number of customers which trust in this kind of management • New trends used in manufacturing process • Low design products	• **NONE**

Why NONE the threats part from SWOT Analyze because pollution, negative factors are created only by the economical agents and us, so we don't have any other competitors to destroy the environment except us.

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